Asymmetrically Timely Response of Earnings to Industry Volume Shocks

ABSTRACT

We provide evidence that researchers examining the timelier response of earnings to bad news than to good news can generate more interpretable results by using industry volume shocks rather than or in addition to returns as the proxy for news. This use provides two main benefits. First, it substantially eliminates known biases in estimates of asymmetric timeliness resulting from the use of returns as the news proxy. Industry return shocks: are removed from firm characteristics (return volatility and loss frequency) known to be associated with these biases; are largely exogenous to individual firms; and drive earnings over the relatively short term, mitigating concerns about unrecognized economic assets immune to conditional conservatism. Second, this use helps researchers distinguish three sources of asymmetric timeliness documented in prior research: conditional conservatism, cost stickiness, and curtailment put options. It is more feasible to identify which costs that are sticky and which investments can be curtailed for individual industries than for the universe of firms. Industry volume shocks interact closely with proxies for resource adjustment costs that determine whether costs are sticky or firms instead curtail the deployment of resources when demand turns down.

Keywords: asymmetric timeliness, conditional conservatism, cost stickiness, curtailment, industry

JEL Classification: M41

1. Introduction

Over twenty years ago, Basu (1997) first conceptualized conditional conservatism as the timelier response of earnings to bad news than to good news ("asymmetric timeliness"). To test this conceptualization, he uses firm-level security returns as the primary proxy of news. This proxy has the desirable features of being both comprehensive and readily available for publicly traded firms. Using this proxy, Basu (1997) demonstrates that earnings respond on a timelier basis to bad news than to good news. He further demonstrates that time-series variation in an annual measure of asymmetric timeliness is positively associated with changes in litigation risk. Hundreds of subsequent studies employ Basu's conceptualization of conditional conservatism as asymmetric timeliness and/or his use of returns as a proxy for news to demonstrate variation in conditional conservatism across firms, time, countries, and many other contextual variables (see Ryan 2006 for an early survey). In this study, we propose and provide descriptive evidence that researchers examining asymmetric timeliness can generate sharper and more interpretable results by using industry volume shocks rather than or in addition to returns as the proxy for news.

Despite Basu's (1997) enormous impact, the literature identifies issues with both his conceptualization of conditional conservatism and his use of returns as the proxy for news. Regarding this conceptualization, earnings exhibit an asymmetrically timely response to news for various reasons other than conditional conservatism. Two recently examined examples of broad economic importance are cost stickiness (Banker et al. 2016) and the exercise of curtailment and similar economic put options (Lawrence et al. 2017). Cost stickiness arises when managers are more reluctant to reduce operating resources as demand weakens to avoid incurring current and future adjustment costs (e.g., the need to retrain skilled employees if demand subsequently strengthens) than to increase resources when demand rises. The timelier response of earnings to bad news is attributable to higher operating costs relative to sales during bad news periods. Curtailment arises when firms reduce operating resources, typically at a current cost (e.g., employee severance payments), when demand weakens. The timelier response of earnings to bad news is attributable to expensing the costs of curtailment activities during bad news periods. Cost stickiness and curtailment, while not mutually exclusive, exhibit the following tension: cost stickiness is more likely to exist for the costs and the circumstances where resource adjustment costs are higher, while curtailment is more likely to occur for the opposite costs and circumstances.

Researchers interested in documenting conditional conservatism need to distinguish it from such other sources of asymmetric timeliness, and vice-versa. Researchers typically attempt to do so by expanding Basu's (1997) empirical model to include proxies that capture these other sources of asymmetric timeliness. For example, Banker et al. (2016) incorporate firm-level sales growth as a proxy for demand shocks, and Lawrence et al. (2017) incorporate an indicator for contemporaneous declines in sales and employees as a proxy for curtailment. These proxies exhibit various limitations. For example, both firm-level sales growth and the curtailment indicator are correlated with returns and thus provide researchers with limited ability to distinguish conditional conservatism from these other sources of asymmetric timeliness. In addition to capturing the intended demand shocks, firm-level sales growth captures firms' endogenous pricing adjustments (e.g., lowering selling price when demand weakens but not raising price when demand strengthens) and any conditionally conservative adjustments to sales (e.g., sales returns).

Regarding returns as a proxy for news, owing to their comprehensiveness, returns have the following undesirable characteristics, among others. Returns are an endogenous function of firms' earnings and disclosure policies (Dietrich et al. 2007; Givoly et al. 2007). The volatility of returns varies across firms and is correlated with the frequency that firms report losses; moreover, sample heterogeneity related to return volatility and loss frequency yields bias in measures of asymmetric timeliness absent adequate control for these firm characteristics (Patatoukas and Thomas 2011; Ball et al. 2013). Returns are a highly forward-looking variable that is largely driven by changes in unrecognized economic assets that are essentially immune to conditional conservatism (Beaver and Ryan 2005; Khan and Watts 2009). In addition, returns are only available for publicly traded firms.

In this study, we propose and provide evidence that the second of these issues is largely eliminated by the use of industry volume shocks as the proxy for news. This proxy is logically removed from and close to uncorrelated with firm characteristics, such as return volatility and loss frequency, that prior research shows bias measures of asymmetric timeliness. This proxy is reasonably viewed as exogenous, because individual firms typically have little effect on an industry's aggregate volume; moreover, industry volume shocks can be measured removing the contribution of the firm being analyzed. This proxy generally drives earnings over the relatively short term, largely eliminating concerns about unrecognized economic assets. The use of volume shocks for other meaningful aggregations of firms, such as those located in the same region, would also largely eliminate these concerns.

We also propose and provide evidence that the use of industry volume shocks as the proxy for news can address the first issue by enabling researchers to better distinguish alternative sources of asymmetric timeliness. To illustrate, assume the researcher's goal is to distinguish cost stickiness and curtailment both from conditional conservatism and from each other. It is considerably more feasible to identify which costs that are sticky versus not and which investments can versus cannot be curtailed for individual industries than for the universe of firms. Compared to returns, industry volume shocks interact more closely with resource adjustment costs, such as the unionization and skill levels of a firm's employees, which determine whether costs are sticky or firms instead curtail the deployment of resources when demand turns down. As a consequence, the use of industry volume shocks as the proxy for news helps us to tease out alternative sources of asymmetric timeliness and thereby to synthesize and extend prior conceptual arguments and empirical evidence.

Consistent with this discussion, we examine two sets of industries—manufacturing firms and skilled nursing facilities—for which we obtain data on industry volume shocks and plausibly predict how and why these shocks manifest in asymmetric timeliness. For 338 distinct manufacturing sub-industries represented by six-digit NAIC codes from 310000 to 339999, we obtain the annual rate of growth in the dollar value of goods shipped to customers by the industry from the Annual Survey of Manufacturers conducted by the Census Bureau during the 2003–2015 period. Shipments are for all publicly traded and private firms in an industry, so industry shipping volume shocks are not subject to measurement error from the exclusion of private firms (Ali et al. 2009). Industry shipping volume shocks are close to uncorrelated with returns, suggesting that the previously documented biases in estimating asymmetric timeliness using returns are unlikely to apply to the estimation using industry shipping volume shocks. Industry shipping volume shocks are also close to uncorrelated with return volatility and loss frequency, further mitigating concerns about bias. As many publicly traded manufacturing firms exist, we conduct the analysis on 2,880 distinct public firms, representing 18,908 firm-years. This sample restriction enables us to compare the results using returns versus using industry shipping volume shocks as the proxy for news.

For skilled nursing facilities, we obtain the annual rate of growth in the room occupancy rate for all skilled nursing facilities in each county from the annual cost reports submitted to the Centers for Medicare & Medicaid Services during the 1998–2014 period. We include all skilled nursing facilities in the sample, because only 14% of these facilities are owned by publicly traded firms, of which the sample includes only 37. To maximize variation in the data, we conduct the analysis on *subsidiary-level* skilled nursing facilities, of which the sample includes 11,350 distinct skilled nursing facilities, representing 108,345 facility-years. As returns are not available for the vast majority of this sample, we conduct this analysis using only industry volume shocks as the proxy for news.

The manufacturing firm analysis yields five primary sets of results. First, we find that earnings exhibit a similarly asymmetrically timely response to industry shipping volume shocks as they do to returns. When including both returns and shipping volume shocks as proxies for news in the model, asymmetric timeliness obtains for both news proxies, consistent with industry shipping volume shocks capturing news incremental to returns. These results using industry shipping volume shocks as the proxy for news provide support for Basu's (1997) conceptualization of conditional conservatism that is not subject to the concerns about the use of returns as the news proxy.

Second, we show that two awkward empirical regularities that commonly result when researchers use returns as the proxy for news are eliminated by the use of industry shipping volume shocks as the proxy for news. Researchers examining samples of firms from the most recent two or three decades typically find a significantly negative coefficient on favorable news (Lawrence et al. 2017, Table 6), reflecting returns' incorporation of expectations about future positive outcomes that will not be reflected in earnings for many periods and are often the result of current investments. Using industry shipping volume shocks as the proxy for news, we find that earnings exhibit an insignificantly positive association with favorable news. Researchers typically find that cash flow from operations exhibits asymmetric timeliness (Collins et al. 2014, Table 2), a finding that cannot plausibly be attributed to conditional conservation. Again using industry shipping volume shocks as the proxy for news, we find that cash flows exhibit insignificant asymmetric timeliness.

Third, reflecting the shorter-term implications of shipping volume shocks than of returns, impairment write-downs of long-lived assets exhibit asymmetrically timely response to returns but not to industry shipping volume shocks. In contrast, other accruals (including inventory and receivable write-downs) exhibit similarly asymmetrically timely responses to both returns and industry shipping volume shocks. These findings indicate that researchers should use proxies for news that correspond to the horizons over which accounting estimates they examine are made.

Fourth, we find that the growth in and level of the number of firms' employees decrease more with both adverse industry shipping volume shocks and returns than they increase with favorable shocks and returns. This finding is consistent with bad news primarily leading to curtailments (e.g., layoffs or hiring below attrition) of employees rather than to labor cost stickiness. We further find that industry shipping volume shocks interact somewhat more strongly and interpretably with measures of employee unionization and skill levels than returns interact with these proxies for labor adjustment costs. Moreover, the former interactions are in the direction consistent with employee curtailments decreasing and labor cost stickiness increasing as labor adjustment costs increase. Specifically, we find that the growth in and level of employees exhibit *less* asymmetrically timely response to industry shipping volume shocks as employee unionization and particularly skill levels *increase*, i.e., when labor adjustment costs are higher.

Fifth, we provide an example of how the use of shipping volume shocks as the proxy for news appears to avoid the biases in estimates of asymmetric timeliness and its determinants that prior research finds result from the use of returns as the proxy for news. The example pertains to

Nikolaev's (2010) finding that asymmetric timeliness measured using returns as the proxy for news increases with the number of covenants in firms' debt contracts, as well as to Patatoukas and Thomas' (2011) finding that biases in estimates of asymmetric timeliness and its determinants result from cross-sectional heterogeneity in return volatility and loss frequency. We show that firms' return volatility and loss frequency exhibit U-shaped relationships with firms' number of covenants, and that these relationships mirror U-shaped relationships between estimates of asymmetric timeliness using returns as the measure of news and the number of covenants. We provide further evidence that these findings are attributable to the bias documented by Patatoukas and Thomas (2011), and that this bias does not exist when industry shipping volume shocks are used as the measure of news.

The skilled nursing facilities analysis yields two primary sets of results, which are consistent with those in the manufacturing firm analysis and thus stated briefly here. First, earnings and accruals exhibit asymmetrically timely responses to occupancy rate shocks, but operating cash flows do not. Second, the response of growth in employees to adverse occupancy rate shocks is attenuated for employees with higher skill levels.

Section 2 describes the manufacturing firms and skilled nursing facilities samples and the corresponding proxies for industry volume shocks. Section 3 develops the empirical models and discusses the empirical analyses. Section 4 concludes.

2. Industry samples and proxies for volume shocks

2.1. Manufacturing industries

We examine manufacturing industries defined as individual six-digit NAIC codes from 310000 to 339999. Our proxy for volume shocks in each industry is the annual rate of growth in the dollar value of goods shipped to customers by the industry (Δ*Shipping*). We obtain the data necessary to calculate Δ*Shipping* from the Annual Survey of Manufacturers (ASM) conducted by the Census Bureau.[1] As part of the Economic Census conducted every five years, the ASM surveys a sample of U.S. manufacturers, with larger manufacturers being more likely to be sampled. ASM data are available for all but one year from 2002 to 2015, enabling us to calculate Δ*Shipping* for these years.[2] Shipments are for all public and private firms in an industry, so industry shipping volume shocks are not subject to measurement error from the exclusion of private firms (Ali et al. 2009). We restrict the sample to publicly traded manufacturers with available data on CRSP and Compustat, which yields a final manufacturing sample of 18,908 firm-years for 2,880 distinct firms in 338 distinct six-digit NAICS codes during the 2003–2015 period. This sample restriction enables us to compare the results using returns versus using industry shipping volume shocks as the proxy for news.

Manufacturing firms may or may not be labor intensive. Their employees may or may not be unionized, and these employees may exhibit a range of skill levels. We expect manufacturing firms to be less likely to lay off unionized and skilled employees when demand turns down. We use the firm's proportion of employees that belong to unions and median hourly wage (i.e., more skilled employees should be paid more) as proxies for labor adjustment costs.

2.2. Skilled nursing facilities

We examine a single service industry: skilled nursing facilities. Our proxy for volume shocks in this industry reflects two industry characteristics. First, room occupancy rate is critical

[1] These data are available at https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ASM_2015_31VS101&prodType=table. We obtain data for 2002–2003 from the 2004 table and the 2007 data from the 2008 table. Data are missing for 2012.

[2] Because data are missing for 2012, we estimate Δ*Shipping* in each of 2012 and 2013 as one-half the two-year growth in the dollar value of goods shipped to customers from 2011 to 2013.

for revenue generation, cost efficiency, and overall profitability in the industry. Second, because skilled nursing facilities have fixed locations, they are exposed to competition, demographic changes, and other economic factors at the reasonably local level. Accordingly, our proxy for industry volume shocks for a given facility is the annual rate of growth in the room occupancy rate for the county in which the facility is located (Δ*Occupancy*). The county-level occupancy rate (i.e., *Occupancy*) is the sum of rooms occupied divided by the sum of rooms available, based on all facilities owned by both publicly traded and private firms in the county.

We obtain the data necessary to calculate Δ*Occupancy* from skilled nursing facilities' annual cost reports submitted to the Centers for Medicare & Medicaid Services (CMS) during the 1998–2014 period.[3] Although CMS data are available prior to 1998, we start the sample in 1998 because the Balanced Budget Act of 1997 significantly altered industry dynamics for skilled nursing facilities.[4] We conduct the analysis on 11,350 distinct subsidiary-level facilities, representing 108,345 facility-years during the 1998–2014 period, because only 14% of skilled nursing facilities during the sample period are owned by only 37 distinct publicly traded firms.

Skilled nursing facilities are labor intensive, employing both higher-skilled registered and licensed practical nurses as well as lesser-skilled nurse assistants and other personnel. We expect skilled nursing facilities to be less likely to lay off higher-skilled nurses than lesser-skilled

[3] The Medicare cost report defines skilled nursing facilities as all free-standing (i.e., non-hospital located) nursing homes that accept Medicare. Skilled nursing facilities typically provide both post-acute care after hospital stays and long-term care. These reports include information about the facility, address, control type (for-profit, government-owned, etc.), related organizations (name, percentage of ownership, and type of business), number of beds (available and used), average length of stay, number of full time employees, direct wage costs (e.g., salaries to registered nurses, licensed practical nurses, and certified nursing assistants), indirect costs (e.g., salaries from administration, building and equipment costs), income statement, and balance sheet. The number of rooms occupied (available) is based on Inpatient Days Spent (Available) in worksheet S-3 Part I. Inpatient days spent is the number of rooms in a facility times the average number of days patients spent in those rooms during the year. Inpatient days available is the number of rooms in a facility times 365.

[4] The Balanced Budget Act of 1997 changed how Medicare pays skilled nursing facilities. Prior to the Act, Medicare reimbursed incurred cost. After the Act, Medicare pays a fixed rate per inpatient day.

personnel when demand turns down. We use the facility's proportions of total salary paid and total hours worked that are attributable to higher-skilled nurses as proxies for labor adjustment costs.

3. Empirical models and results

3.1 Expanded Basu (1997) models

Similar to Banker et al. (2016) and Lawrence et al. (2017), our empirical models are straightforward expansions and/or other modifications of the primary model in Basu (1997). In each of these models, the dependent variable is potentially subject to one or more sources of asymmetric timeliness. Following prior research, we examine the following accounting-related dependent variables that may be subject to conditional conservatism and other sources of asymmetric timeliness: earnings (*Earnings*), return on beginning assets (*ROA*), accruals (*Accruals*), operating cash flows (*Cash Flow*), impairments of long-lived assets (*Write-downs*), and other accruals (*Other Accruals*). *Earnings* are deflated by beginning market capitalization in the manufacturing firm analysis, while *Accruals*, *Cash Flow*, *Write-downs*, and *Other Accruals* are all deflated by beginning assets in both the manufacturing firm and the skilled nursing facility analyses. In addition, analogous to a robustness test examining a proprietary sample of employee layoffs in Lawrence et al. (2017), we examine annual percentage growth in the number of employees (Δ*Employee*) and the number of employees divided by beginning assets (*Employee/Asset*) to examine asymmetric timeliness related to labor cost stickiness and employee curtailment. We refer to all of these dependent variables collectively by *Dependent Variable*.

The explanatory variables include three sets of variables: (1) indicators for negative annual share returns (*DReturns*) or industry volume shocks (*D*Δ*Volume*); (2) annual share returns (*Return*) or industry volume shocks (Δ*Volume*), and (3) the product(s) of the corresponding values of (1) and (2). We refer to *(D)Return* and *(D)*Δ*Volume* collectively as *(D)News*. The measure of

(D)ΔVolume used is *(D)ΔShipping* in the manufacturing firm analysis and *(D)ΔOccupancy* in the skilled nursing facility analysis.

In the standard Basu (1997) model, the dependent variable is *Earnings* and the explanatory variables are *DReturn*, *Return*, and *DReturn×Return*. Replacing *Earnings* with the stand-in *Dependent Variable* and adding *DΔVolume*, *ΔVolume*, and *DΔVolume×ΔVolume* as explanatory variables yields our primary empirical model:

$$\text{Dependent Variable}_t = \alpha + \beta_1 \text{DReturn}_t + \beta_2 \text{Return}_t + \beta_3(\text{DReturn}_t \times \text{Return}_t) + \gamma_1 \text{D}\Delta\text{Volume}_t + \gamma_2 \Delta\text{Volume}_t + \gamma_3(\text{D}\Delta\text{Volume}_t \times \Delta\text{Volume}_t). \tag{1}$$

Basu (1997) finds that β_3 is negative when *Dependent Variable* is *Earnings*, *Accruals*, or *Cash Flow*, and other researchers find this result when *Dependent Variable* is *Write-downs* or *Other Accruals*. For the first two of these dependent variables, Basu (1997) interprets this coefficient as evidence of conditional conservatism, although subsequent researchers interpret these findings as attributable to various biases or other sources of asymmetric timeliness. We similarly expect that γ_3 is negative for these dependent variables. Moreover, we expect estimates of γ_3 to be much less subject to the biases in the estimation of β_3 identified by the literature.

When the dependent variable in equation (1) is *ΔEmployee* or *Employee/Asset*, we expect β_3 and γ_3 to be negative to the extent that labor costs are sticky when news is bad, and we expect these coefficients to be positive to the extent that employees are curtailed when news is bad. Thus, estimation of equation (1) with these dependent variables enables us to distinguish cost stickiness from curtailment.

To explore this distinction further, we expand the versions of equation (1) with *ΔEmployee* or *Employee/Asset*, collectively denoted *Employee Variable*, as the dependent variable to interact the explanatory variables with a measure of unionized or skilled employees, i.e., a proxy for labor adjustment costs (*Labor Adj. Cost*). We expect higher labor adjustment costs to yield more cost stickiness and less curtailment. To mitigate model complexity and multicollinearity, we include only one of the two news proxy variables at a time in the models that interact the news proxy variables with *Labor Adj. Cost$_t$*:

$$\begin{aligned}\text{Employee Variable}_t = {} & \alpha + \rho_1 \text{D}\Delta\text{News}_t + \rho_2\Delta\text{News}_t + \rho_3(\text{D}\Delta\text{News}_t\times\Delta\text{News}_t) \\ & + \delta_0\text{Labor Adj. Cost}_t + \delta_1(\text{Labor Adj. Cost}_t\times\text{D}\Delta\text{News}_t) \qquad (2) \\ & + \delta_2(\text{Labor Adj. Cost}_t\times\Delta\text{News}_t) \\ & + \delta_3(\text{Labor Adj. Cost}_t\times\text{D}\Delta\text{News}_t\times\Delta\text{News}_t).\end{aligned}$$

We expect more cost stickiness and less curtailment when *Labor Adj. Cost* is higher, and thus δ_3 to be negative.

3.2. Manufacturing firm analysis

Summary statistics and correlations. Table 1, Panel A reports variable means, quartiles, and standard deviations for the manufacturing firm sample. All variables except for the unionization rate (*Union Rate*), *Volatility* and *Loss Frequency* are available for all 18,908 firm-year observations. We collect *Union Rate* from publicly traded firms' Form 10-K filings; most of these firms do not report or even mention the level of unionization, so *Union Rate* is available only for 759 observations. *Volatility* and *Loss Frequency* are calculated based on the prior two years of data, which are available for 18,734 and 13,281 observations respectively.

Reflecting the breadth of the manufacturing firm sample, the statistics for most variables are similar to those reported in prior research and so for brevity we do not discuss them. The mean of Δ*Shipping* is 3 percent, with a standard deviation of 15 percent. The mean of Δ*Employee* is 6 percent, with a standard deviation of 26 percent. The mean of *Union Rate* is 22 percent, with a standard deviation of 21 percent. The median hourly wage in the industry from the Bureau of Labor

Statistics (*Median Wage*) is \$21.42 per hour, with a standard deviation of \$5.28 per hour. We collect the mean number of covenants in public debt contracts from Mergent (*Covenant*). The mean of *Covenant* is 1.06, with a standard deviation of 2.15. The standard deviations of these key variables indicate considerable variation across the sample manufacturing industries, suggesting our tests should be reasonably powerful.

Table 1, Panel B reports the Pearson (upper right triangle) and Spearman (lower left triangle) correlations of the variables for the manufacturing sample. Interestingly, Δ*Shipping* is slightly but significantly *negatively* correlated with *Return* (Pearson only) and *Cash Flow*, suggesting Δ*Shipping* conveys very different types of news than does *Return*. More as expected, Δ*Shipping* is significantly positively correlated with *Earnings*, *Accruals*, *Write-downs* (Spearman only), *Other Accruals*, Δ*Employee*, and *Employee/Asset*. Δ*Shipping* is significantly negatively correlated with *Median Wage*, consistent with expanding (contracting) industries disproportionately hiring (firing) less skilled employees. On the other hand, Δ*Employee* is significantly positively correlated and *Employee/Asset* is significantly negatively correlated with *Median Wage*, consistent with small and growing firms having to pay higher salaries to attract employees.

Covenant is significantly positively correlated with *Return* as well as all of the earnings, accruals, and cash flow variables, but it is insignificantly correlated with Δ*Shipping*. *Covenant* is significantly negatively correlated with the firm characteristics Δ*Employee*, *Employee/Asset*, *Union Rate* (Pearson only and weakly), *Median Wage*, *Volatility*, and *Loss Frequency*. These correlations suggest that, in the analysis of the association of *Covenant* with asymmetric timeliness, it is even more important than usual to use a measure of news, such as Δ*Shipping*, that is logically removed from and close to uncorrelated with firm characteristics, such as return volatility and loss frequency.

In untabulated analysis, we estimated the correlations of Δ*Shipping* with two firm characteristics that Patatoukas and Thomas (2011) find are associated with biased estimates of asymmetric timeliness using returns: return volatility and loss frequency. For each of these characteristics, we examine the value in the current year, past five years, and next five years. These six correlations range from -0.02 to 0.04, consistent with Δ*Shipping* being minimally correlated with these firm characteristics.

Replication of Basu (1997) with Δ*Shipping* as the proxy for news. Table 2 reports the OLS estimation of equation (1) with dependent variables *Earnings* (columns 1–3) and *ROA* (columns 4–6). For each of these dependent variables, the first (second) column reports the estimation of the nested model with only *Return* (Δ*Shipping*) as the proxy for news, while the third column reports the estimation of the full model.

For the model in column (1) with *Earnings* as the dependent variable and *Return* as the sole proxy for news, consistent with prior research using samples from the last two or three decades, the coefficient β_2 on *Return* is significantly negative, reflecting returns' incorporation of expectations about future positive outcomes that will not be reflected in earnings for many periods and are often the result of current investments. The coefficient β_3 on *DReturn*×*Return* is significantly positive, consistent with conditional conservatism or another source of asymmetric timeliness. For the model in column (2) with *Earnings* as the dependent variable and Δ*Shipping* as the sole proxy for news, the coefficient γ_2 on Δ*Shipping* is insignificantly positive, not significantly negative, reflecting the shorter-term implications of shipping volume shocks than of returns. The coefficient γ_3 on *D*Δ*Shipping*×Δ*Shipping* is significantly positive, consistent with conditional conservatism or another source of asymmetric timeliness. For the model in column (3) with *Earnings* as the dependent variable and both *Return* and Δ*Shipping* as proxies for news, the coefficients are virtually identical to those in the columns for the nested models; the two sources of news do not cannibalize each other, reflecting their insignificant Spearman correlations and slightly negative Pearson correlations discussed above.

The models with ROA as the dependent variable in the right three columns of Table 2 yield mostly the same inferences. The only notable difference is the coefficient β_2 on *Return* is *in*significantly negative.

Accruals versus operating cash flows. Table 3 reports the OLS estimation of equation (1) with dependent variables *Accruals* (columns 1–3) and *Cash Flow* (columns 4–6). The columnar structure of the table is identical to that of Table 2. The results of the *Accruals* models are similar to those for the corresponding *Earnings* models reported in Table 2. For the model in column (1), the coefficient β_2 on *Return* is again significantly negative and the coefficient β_3 on *DReturn*×*Return* is again significantly positive. For the model in column (2), the coefficient γ_2 on Δ*Shipping* is again insignificantly positive and the coefficient γ_3 on *D*Δ*Shipping*×Δ*Shipping* is again significantly positive. For the model in column (3), the coefficients are again virtually identical to those in the columns for the nested models.

In contrast, the results of the *Cash Flow* models are distinct from those for the corresponding *Earnings* models reported in Table 2. The coefficients on returns-related variables are similar to those found in prior research. For the model in column (4), the coefficient β_2 on *Return* is insignificantly positive and the coefficient β_3 on *DReturn*×*Return* is significantly positive, consistent with asymmetric timeliness that is not plausibly attributable to conditional conservatism. For the model in column (5), the coefficient γ_2 on Δ*Shipping* and the coefficient γ_3

on *D*Δ*Shipping*×Δ*Shipping* are both insignificantly positive, indicating minimal association between Δ*Shipping* and *Cash Flow* across the entire domain of Δ*Shipping*. For the model in column (3), the coefficients are again virtually identical to those in the columns for the nested models.

Impairments of long-lived assets versus other accruals. Table 4 reports the OLS estimation of equation (1) with the dependent variables *Write-downs* (columns 1–3) and *Other Accruals* (columns 4–6). The columnar structure of the table is again identical to that of Table 2. The coefficients on the returns-related variables in both the *Write-downs* and *Other Accruals* models have similar magnitudes and significance as of those for the corresponding *Accruals* models reported in Table 3, consistent with *Returns* having roughly the same implications regarding asymmetric timeliness for the longer- and shorter-term components of *Accruals*. In contrast, the shipping volume-related variables are insignificantly associated with *Write-downs*, consistent with these variables capturing shorter-term effects than this long-term component of accruals. In the estimation in column (5), the coefficient on Δ*Shipping* is insignificantly positive, while the coefficient on *D*Δ*Shipping*×Δ*Shipping* is significantly positive, consistent with these shorter-term accruals exhibiting asymmetric timeliness with respect to Δ*Shipping*.

Distinguishing cost stickiness and curtailment. Table 5 reports the OLS estimation of equation (1) with the dependent variables Δ*Employee* (columns 1–3) and *Employee/Asset* (columns 4–6). Both of these dependent variables are not accounting related and thus have no direct relationship to conditional conservatism. However, the variables are affected differently by labor cost stickiness, which should cause the variables to decline less with bad news than they increase with good news, than by curtailment of employees, which should cause the variables to decline more strongly with bad news than they increase with good news. As discussed above, this difference enables us to distinguish these two alternative sources of asymmetric timeliness.

Table 5 reports that both Δ*Employee* and *Employee/Asset* decrease significantly more when both of the news proxies are negative than they increase when the proxies are positive. These results are consistent with curtailment of employees rather than with labor cost stickiness.

Table 6 reports the OLS estimation of equation (2) with Δ*Employee* as the dependent variable, with the *Labor Adj. Cost* proxy being *Union Rate* in the left two columns and *Median Wage* in the right two columns, and with the news proxy being *Return* in columns (1) and (3) and Δ*Shipping* in columns (2) and (4). Increases in the *Labor Adj. Cost* proxy should be associated with more cost stickiness and less curtailment. Consistent with the results in Table 5, columns (1), (2), and (4) of Table 6 report a significant positive coefficient on the interactive bad news variable, *DNews×News*, consistent with curtailment. In all three of these columns, the coefficient on *Labor Adj. Cost×DNews×News* is negative, significantly so in column (1) (10% level) and column (4). These results provide some evidence that cost stickiness increases with labor adjustment costs. On the other hand, column (3) reports a weakly significantly positive coefficient on *Labor Adj. Cost×DNews×News*, for which it is difficult to provide an economic interpretation.

Table 7 reports the OLS estimation of equation (2) with *Employee/Asset* as the dependent variable, and the explanatory variables and columnar structure being the same as in Table 6. Consistent with the results in Tables 5 and 6, all four columns of Table 7 report a significant positive coefficient on the interactive bad news variable, *DNews×News*, consistent with curtailment. The coefficient on *Labor Adj. Cost×DNews×News* is negative in all four columns, significantly so in columns (3) and (4), providing further evidence that cost stickiness increases with labor adjustment costs.

Based on the results in Tables 6 and 7, we conclude that Δ*Shipping* interacts somewhat more strongly and interpretably with measures of employee unionization and skill levels than *Return* interacts with these proxies for labor adjustment costs. This conclusion has two primary bases. First, the weakly significantly positive coefficient on *Labor Adj. Cost*×*DNews*×*News* in the model with *Return* as the proxy for news report in column (3) of Table 6 is difficult to explain on economic grounds. Second, this coefficient is always interpretably negative when Δ*Shipping* is the proxy for news in both tables, significantly so in the two columns where the broader measure *Median Wage* is the *Labor Adj. Cost* proxy, consistent with the growth in and level of employees exhibiting *less* asymmetrically timely response to Δ*Shipping* when labor adjustment costs are higher.

Debt covenants and the conditional conservatism–driven asymmetric timeliness documented in Nikolaev (2010). In this section, we provide an example of how the use of Δ*Shipping* as the proxy for news appears to avoid the biases in estimates of asymmetric timeliness and its determinants that prior research finds result from the use of *Return* as the proxy for news. The example pertains to Nikolaev's (2010) finding that asymmetric timeliness measured using returns as the proxy for news increases with the number of debt covenants, both overall and of five distinct types. Nikolaev (2010) motivates his analysis by the statement (which we find entirely reasonable) that "[c]ovenants are expected to constrain managerial opportunism...only if the accounting system recognizes economic losses in a timely fashion", i.e., to the extent that accounting is conditionally conservative. The example also pertains to Patatoukas and Thomas' (2011) finding that biases in estimates of asymmetric timeliness and its determinants result from cross-sectional heterogeneity in return volatility (i.e., the spread of the distribution of the news proxy) and loss frequency (i.e., the average level of earnings).

We first show that firms' return volatility and loss frequency are non-linearly related to the number of covenants in firms' debt contracts. Figures 1 and 2 depict U-shaped relationships between return volatility and loss frequency, respectively, measured over the past two years with the overall number of covenants. For low numbers of covenants (0 to 2, and to a lesser extent 3 and 4), median return volatility and mean loss frequency (80 to 90 percent for 0 to 2 covenants) are both much higher than the sample norms. For medium numbers of covenants (5 and 6), median return volatility and average loss frequency (20 to 30 percent) are both much lower than the sample norms. For high numbers of covenants (7 or more), return volatility and loss frequency (about 50 percent) both take fairly normal values.

These U-shaped relationships suggest that the potential for the bias documented by Patatoukas and Thomas (2011) is high in the empirical analysis of the relationship between estimates of asymmetric timeliness using returns as the proxy for news and the number of covenants. Moreover, the non-linearity of these relationships suggest that this bias is unlikely to be eliminated by the inclusion of linear controls or other typical research design choices short of fully constraining sample heterogeneity in return volatility and loss frequency. The specific reason for these U-shaped relationships is not essential to our purpose in this example. However, we conjecture that the reason is that covenants tend to be useful when two conditions hold. First, firms are at least reasonably risky, as reflected in appreciable return volatility and loss frequency. Second, firms' earnings and other summary accounting measures are reasonably good at discriminating good from bad outcomes, as reflected in loss frequency that is not too close to 100 percent. This reason is not inconsistent with, and in fact marries readily enough, with Nikolaev's (2010) arguments for why the number of covenants is associated with conditional conservatism–driven asymmetric timeliness.

We now show that the estimated association of the number of covenants with asymmetric timeliness interacts with, and is sensitive to the inclusion of controls for, return volatility and loss frequency. Nikolaev (2010) estimates the following model (his equation (1)) in which the number of covenants (*Covenant*) is added to and interacted with the explanatory variables in the original Basu (1997) model.

$$\begin{aligned} Earnings_t = \alpha &+ \beta_1 DReturn_t + \beta_2 Return_t + \beta_3 (DReturn_t \times Return_t) \\ &+ \mu_0 Covenant_t + \mu_1 (Covenant_t \times DReturn_t) \\ &+ \mu_2 (Covenant_t \times Return_t) + \mu_3 (Covenant_t \times DReturn_t \times Return_t). \end{aligned} \tag{Nikolaev}$$

Nikolaev (2010) reports in his Table 2 that the coefficient μ_3 on $Covenant_t \times DReturn_t \times Return_t$ is highly significantly positive for the overall and four specific types of covenants, and weakly significantly positive for the fifth type of covenant, consistent with asymmetric timeliness increasing with number of covenants. If we estimate equation (Nikolaev) on our sample, we also find that μ_3 is positive and highly significant.

We estimate models similar to equation (Nikolaev), although to capture the U-shapes depicted in Figures 1 and 2, rather than including *Covenant* linearly and interactively, we include indicators for number of covenants from 1 to 3, from 4 to 6, and of 7 or more, e.g., *Covenant(1-3)*, *Covenant(4-6)*, and *Covenant(7-11)*. We also estimate the model with either *Return* or Δ*Shipping* as the proxy for news and without or with linear and interactive controls for return volatility (*Volatility*) and loss frequency (*Loss*).

$$
\begin{aligned}
\text{Earnings}_t = \alpha &+ \beta_1\text{DNews}_t + \beta_2\text{News}_t + \beta_3(\text{DNew}_t\times\text{News}_t) \\
&+ \mu_{1\text{-}3,0}\text{Covenant(1-3)}_t + \mu_{1\text{-}3,1}(\text{Covenant(1-3)}_t\times\text{DNews}_t) \\
&+ \mu_{1\text{-}3,2}(\text{Covenant(1-3)}_t\times\text{News}_t) + \mu_{1\text{-}3,3}(\text{Covenant(1-3)}_t\times\text{DNews}_t\times\text{News}_t) \\
&+ \mu_{\text{-}4\text{-}6,0}\text{Covenant(4-6)}_t + \mu_{4\text{-}6,1}(\text{Covenant(4-6)}_t\times\text{DNews}_t) \\
&+ \mu_{4\text{-}6,2}(\text{Covenant(4-6)}_t\times\text{News}_t) + \mu_{4\text{-}6,3}(\text{Covenant(4-6)}_t\times\text{DNews}_t\times\text{News}_t) \\
&+ \mu_{\geq 7,0}\text{Covenant}(\geq 7)_t + \mu_{\geq 7,1}(\text{Covenant}(\geq 7)_t\times\text{DNews}_t) \qquad (3) \\
&+ \mu_{\geq 7,2}(\text{Covenant}(\geq 7)_t\times\text{News}_t) + \mu_{\geq 7,3}(\text{Covenant}(\geq 7)_t\times\text{DNews}_t\times\text{News}_t) \\
&+ \zeta_0\text{Volatility}_t + \zeta_1(\text{Volatility}_t\times\text{DNews}_t) \\
&+ \zeta_2(\text{Volatility}_t\times\text{News}_t) + \zeta_3(\text{Volatility}_t\times\text{DNews}_t\times\text{News}_t) \\
&+ \eta_0\text{Loss}_t + \eta_1(\text{Loss}_t\times\text{DNews}_t) \\
&+ \eta_2(\text{Loss}_t\times\text{News}_t) + \eta_3(\text{Loss}_t\times\text{DNews}_t\times\text{News}_t).
\end{aligned}
$$

Table 8 reports the estimate of equation (3) with *Return* as the proxy for news in columns (1) and (2), with Δ*Shipping* as this proxy in columns (3) and (4), without linear and interactive controls for *Volatility* and *Loss* in columns (1) and (3), and with these controls in columns (2) and (4). In column (1), the coefficient on the interaction of the *Covenant* variable with *Return*×*DReturn* is most positive and significant for the interaction involving *Covenant(1-3)*, next most positive and significant for *Covenant(≥7)*, and least positive and insignificant for *Covenant(4-6)*. These coefficients are consistent with conditional conservatism increasing when the number of covenants rises from zero to a low number of covenants, but not beyond that number. Moreover, a plausible explanation for the U-shape in these coefficients is that this shape reflects the U-shapes of the associations of return volatility and loss frequency with *Covenant* rather than the effect of Covenant holding return volatility and loss frequency constant, i.e., reflects the bias documented by Patatoukas and Thomas (2011).

The estimation of the expansion of equation (3) with *Volatility* and *Loss* included linearly and interactively reported in column (2) provides some support for this explanation. Four of these additional variables, none of which *directly* captures asymmetric timeliness, are significant and interpretable. The weakly significantly positive coefficient on *Volatility* is consistent with riskier firms having higher costs of capital and thus higher (price-scaled) *Earnings*. The significantly negative coefficient on *Volatility×Return* is consistent with attenuation of the relationship between *Earnings* and the news proxy *Return* attributable to greater spread in the distribution of that proxy. The significantly negative coefficient on *Loss* is consistent with loss firms on average recording lower *Earnings*. The significantly negative coefficient on *Loss×Return* is consistent with attenuation of the relationship between *Earnings* and the news proxy *Return* attributable to losses even for favorable levels of *Return*. As discussed in detail by Patatoukas and Thomas (2011), the bias in estimates of asymmetric timeliness result essentially from switching between higher versus lower or steeper versus shallower relationships between *Earnings* and *Return* across different portions of the domain of *Return*.

More interestingly, the inclusion of these additional variables: reduces the coefficient on the interaction of *Covenant(1-3)* with *Return×DReturn*, rendering this coefficient insignificant; increases the coefficient on the interaction of *Covenant(4-6)* with *Return×DReturn*, rendering this coefficient weakly significant; and reduces the coefficient on the interaction of *Covenant(≥7)* with *Return×DReturn*, rendering this coefficient only weakly significant. The combination of these effects eliminates the U-shape in these coefficients found in column (1), and it somewhat decreases the strength and significance of the overall evidence that covenants are associated with asymmetric timeliness.

In contrast, none of these effects are present in the estimations of equation (3) with Δ*Shipping* as the proxy for news reported in columns (3) and (4). All of the coefficients on the covenant indicators with Δ*Shipping*×*D*Δ*Shipping* in the two columns are insignificant, regardless of whether the equation includes *Volatility* and *Loss* linearly and interactively. Moreover, the coefficients on the interactions of *Volatility* and *Loss* with Δ*Shipping*×*D*Δ*Shipping* are significantly negative and positive, respectively, indicating that any biases in estimates of asymmetric timeliness attributable to cross-sectional heterogeneity in return volatility and loss are reflected in these variables, not in the variables involving the indicators for different numbers of covenants.

In summary, the evidence reported in Table 8 is consistent with the use of Δ*Shipping* as the proxy for news substantially mitigating the biases in estimates of asymmetric timeliness documented by Patatoukas and Thomas (2011) as applied in the debt covenant setting examined by Nikolaev (2010). We emphasize, however, that we do not mean to suggest that these results imply that Δ*Shipping* is in all respects a preferable news proxy than the uniquely comprehensive and highly firm-specific proxy *Return*.

3.3. Skilled nursing facilities analysis

Summary statistics and correlations. Table 9, Panel A reports variable means, quartiles, and standard deviations for the skilled nursing facility sample. All variables except for the percentages of total salary paid and total hours worked that are attributable to registered nurses (Bachelor's degree) and licensed practical nurses (a one- or two-year program), *Skill-Salary* and *Skill-Hour*, respectively, are available for all 108,345 facility-year observations during the 1998–2014 period. *Skill-Salary* and *Skill-Hour* are only available for 19,623 observations beginning in 2010. We again discuss only the novel variables given prior research. The mean of Δ*Occupancy* is 0 percent, with a standard deviation of 5 percent. The mean of Δ*Employee* is 23 percent, with a standard deviation of 114 percent. The mean of *Employee/Asset* is 5 percent, with a standard deviation of 9 percent. The mean of *Skill-Salary* is 36 percent, with a standard deviation of 8 percent. The mean of *Skill-Hour* is somewhat lower at 22 percent, with a standard deviation of 5 percent, reflecting the fact that more skilled employees are paid more per hour worked. These standard deviations indicate reasonable variation across the single-industry sample, suggesting our tests should be reasonably powerful.

Table 9, Panel B reports the Pearson (upper right triangle) and Spearman (lower left triangle) correlations of the variables for the skilled nursing facility sample. As expected, Δ*Occupancy* is significantly positively correlated with *ROA*, *Accruals* (Spearman only), *Cash Flow*, and Δ*Employee.* Δ*Occupancy* and Δ*Employee* are significantly negatively correlated with *Skill-Hour*, consistent with expanding (contracting) industries disproportionately hiring (firing) less skilled employees.

Replication of Basu (1997) with Δ*Occupancy* as the proxy for news. The first column of Table 10 reports the OLS estimation of equation (1) with dependent variable *ROA* and with Δ*Occupancy* as the proxy for news. The coefficient γ_2 on Δ*Occupancy* is insignificant, but the coefficient γ_3 on *D*Δ*Occupancy*×Δ*Occupancy* is significantly positive, consistent with conditional conservatism or other sources of asymmetric timeliness.

Accruals versus operating cash flows. The second and third columns of Table 10 reports the OLS estimation of equation (1) with dependent variables *Accruals* and *Cash Flow* and with Δ*Occupancy* as the proxy for news. For the *Accruals* model in the second column, the coefficient γ_2 on Δ*Occupancy* is significantly negative, perhaps because higher occupancy increases usage of inventories or accrual payables for labor and other inputs. The coefficient γ_3 on

*D*Δ*Occupancy*×Δ*Occupancy* is again significantly positive, consistent with conditional conservatism or other sources of asymmetric timeliness. In contrast, for the *Cash Flow* model in the third column, the coefficient γ_2 on Δ*Occupancy* is significantly positive, and the coefficient γ_3 on *D*Δ*Occupancy*×Δ*Occupancy* is insignificant, inconsistent with asymmetric timeliness.

Distinguishing cost stickiness and curtailment. Table 11 reports the OLS estimation of equation (2) with the dependent variables Δ*Employee* (the first two columns) and *Employee/Asset* (the third and fourth columns). As noted previously, these dependent variables have no direct relationship to conditional conservatism. Both variables are affected differently by cost stickiness, which causes them to decline less with bad news than they increase with good news, than by curtailment of employees, which causes them to decline more strongly with bad news than they increase with good news. This difference enables us to distinguish these two sources of asymmetric timeliness. Δ*Occupancy* is the proxy for news, and the *Labor Adj. Cost* proxy is Skill-Salary in the first and third columns and *Skill-Hours* in the second and fourth columns. As noted previously, higher *Labor Adj. Cost* should yield more cost stickiness and less curtailment.

For the model with dependent variable Δ*Employee* reported in the first two columns of Table 11, the coefficient on the interactive bad news variable, *D*Δ*Occupancy*×Δ*Occupancy* is weakly significantly positive, consistent with curtailment. The coefficient on *Labor Adj. Cost*×*D*Δ*Occupancy*×Δ*Occupancy* is weakly significantly negative in both columns, providing evidence that cost stickiness increases with labor adjustment costs. On the other hand, these coefficients are all insignificant in the model with dependent variable *Employee/Asset* reported in the third and fourth columns of Table 11.

4. Conclusion

In this study, we propose and provide descriptive evidence that researchers examining the timelier response of earnings to bad news than to good news ("asymmetric timeliness"), one of the largest literatures in accounting over the past two decades, can generate sharper and more interpretable results by using industry volume shocks rather than or in addition to returns as the proxy for news. In the seminal paper, Basu (1997) first conceptualized conditional conservatism as asymmetric timeliness. Subsequent studies show that asymmetric timeliness also results from cost stickiness (Banker et al. 2016), the exercise of curtailment and similar economic put options (Lawrence et al. 2017), and other factors. Hence, researchers interested in documenting a particular source of asymmetric timeliness, say conditional conservatism, need to distinguish it from the other sources of asymmetric timeliness, say cost stickiness and curtailment.

To test his conceptualization, Basu (1997) uses firm-level security returns as the primary proxy of news, a choice followed by most of the subsequent literature. However, a number of studies argue and provide evidence that returns have the following undesirable features that yield bias in estimates of asymmetric timeliness. Returns are an endogenous function of firms' earnings and disclosure policies (Dietrich et al. 2007; Givoly et al. 2007). The volatility of returns varies across firms and is correlated with the frequency that firms report losses, yielding bias in measures of asymmetric timeliness absent adequate control for return volatility (Patatoukas and Thomas 2011; Ball et al. 2013). Returns are a highly forward-looking variable that is largely driven by changes in unrecognized economic assets that are essentially immune to conditional conservatism (Beaver and Ryan 2005; Khan and Watts 2009). Hence, researchers interested in estimating asymmetric timeliness without bias need an alternative widely available and reasonably comprehensive proxy for news.

In this study, we propose and provide evidence that the use of industry volume shocks as the proxy for news is a viable solution to the problems with returns as a proxy for news. While reasonably comprehensive and available for many industries, industry volume shocks are logically removed from and close to uncorrelated with the firm characteristics that prior research shows bias measures of asymmetric timeliness. These shocks are reasonably viewed as exogenous, because individual firms typically have little effect on an industry's aggregate volume; moreover, industry volume shocks can be measured removing the contribution of the firm being analyzed. These shocks generally drives earnings over the relatively short term, largely eliminating concerns about unrecognized economic assets.

In addition, we propose and provide evidence that the use of industry value shocks as the proxy for news help researchers distinguish conditional conservatism, cost stickiness, and curtailment as sources of asymmetric timeliness. It is considerably more feasible to identify which costs that are sticky versus not and which investments can versus cannot be curtailed for individual industries than for the universe of firms. We provide evidence that, compared to returns, industry volume shocks interact more closely with proxies for labor adjustment costs—
the unionization rate and skill levels of a firm's employees—which determine whether costs are sticky or firms instead curtail the deployment of resources when demand turns down. As a consequence, the use of industry volume shocks as the proxy for news helps us to tease out alternative sources of asymmetric timeliness and thereby to synthesize and extend prior conceptual arguments and empirical evidence.

We examine two sets of industries—manufacturing firms and skilled nursing facilities—for which we obtain data on industry volume shocks and plausibly predict how and why these shocks manifest in asymmetric timeliness. For 338 distinct manufacturing sub-industries represented by six-digit NAIC code from 310000 to 339999, we obtain the annual rate of growth in the dollar value of goods shipped to customers by the industry from the Annual Survey of Manufacturers conducted by the Census Bureau during the 2003–2015 period. For skilled nursing facilities, we obtain the annual rate of growth in the room occupancy rate for each county from the annual cost reports submitted to the Centers for Medicare & Medicaid Services during the 1998–2014 period. Analogous measures of industry volume shocks are available for many other industries from Census Bureau, other governmental and regulatory, and industry sources.

We provide the following empirical evidence. First, earnings exhibit an asymmetrically timely response to industry volume shocks that is similar in magnitude and significance to the asymmetrically timely response of earnings to returns. This result provide support for Basu's (1997) conceptualization of conditional conservatism that is not subject to the various concerns expressed about the use of returns as the proxy for news.

Second, two awkward empirical regularities that commonly result when researchers use returns as the proxy for news—negative coefficients on good news and operating cash flows exhibiting asymmetric timeliness—are eliminated by the use of industry volume shocks as the proxy for news.

Third, reflecting the shorter-term implications of industry volume shocks than of returns, impairment write-downs of long-lived assets exhibit asymmetrically timely response to returns but not to industry volume shocks. In contrast, other accruals (including inventory and receivable write-downs) exhibit similarly asymmetrically timely responses to both returns and industry volume shocks. These findings indicate that researchers should use proxies for news that correspond to the horizons over which accounting estimates they examine are made.

Fourth, the growth in and level of the number of firms' employees decrease more with both adverse industry volume shocks and returns than they increase with favorable shocks and returns. This finding is consistent with bad news primarily leading to curtailments of employees rather than to labor cost stickiness. We further find that industry volume shocks interact more strongly and interpretably with measures of employee unionization and skill levels than do returns. Moreover, the former interactions are in the direction consistent with employee curtailments decreasing and labor cost stickiness increasing as labor adjustment costs increase. Specifically, we find that the growth in and level of employees exhibit *less* asymmetrically timely response to industry volume shocks as employee unionization and skill levels *increase*, i.e., when labor adjustment costs are higher.

Fifth, the use of shipping volume shocks as the proxy for news appears to avoid the biases in estimates of asymmetric timeliness and its determinants that prior research finds result from the use of returns as the proxy for news. We examine whether Nikolaev's (2010) finding that asymmetric timeliness measured using returns as the proxy for news increases with the number of covenants in firms' debt contracts is subject to Patatoukas and Thomas' (2011) finding that bias in estimates of asymmetric timeliness and its determinants result from cross-sectional heterogeneity in return volatility and loss frequency. We show that firms' return volatility and loss frequency exhibit U-shaped relationships with firms' number of covenants, and that these relationships mirror U-shaped relationships between estimates of asymmetric timeliness using returns as the measure of news and the number of covenants. We provide further evidence that these findings are attributable to the bias documented by Patatoukas and Thomas (2011), and that this bias does not appear to exist when industry shipping volume shocks are used as the measure of news.

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Appendix Variable Definitions

Count variables are transformed by the logarithm function.

Manufacturing Industries	
Return	Twelve-month cumulative return from the fourth month after the prior fiscal year end (CRSP: RET)
ΔShipping	Annual rate of growth in the dollar value of goods shipped to customers by the industry (Census Bureau Annual Survey of Manufacturers)
Earnings	Annual earnings before extraordinary items (Compustat: IB) deflated by beginning market capitalization (CRSP: PRC×SHROUT)
ROA	Earnings (Compustat: IB) deflated by beginning total assets (Compustat: AT)
Accruals	Earnings minus operating cash flow deflated by beginning total assets
Cash Flow	Operating cash flow from the statement of cash flow (Compustat: OANCF) deflated by beginning total assets (Compustat: AT). If statement of cash flow is missing, we use the balance sheet approach following Collins et al. (2014) Footnote 5
Write-downs	Impairments of long-lived assets (Compustat: WDP and GDWLIP) deflated by beginning total assets (Compustat: AT)
Other Accruals	Accruals minus write-downs deflated by beginning total assets
ΔEmployee	Annual percentage growth in the number of employees (Compustat: EMP)
Employee/Asset	Number of employees deflated by beginning total assets times 1,000
Union Rate	Percentage of employees belonging to unions (collected from 10-Ks)
Median Wage	Median hourly rate by the industry (Bureau of Labor Occupational Employment Statistics)
Covenant	Number of covenants in public debts (Mergent Fixed Income Securities)
Volatility	Standard deviation of twenty-four monthly stock returns from year t-2 to year t-1 (CRSP: RET)
Loss Frequency	Count of losses, negative annual earnings before extraordinary items (Compustat: IB), from year t-2 to year t-1

Appendix Variable Definitions (Cont.)

Count variables are transformed by the logarithm function.

Skilled Nursing Facilities

ΔOccupancy	Annual rate of growth in the room occupancy rate for the county in which the facility is located (CMS cost report). The county-level occupancy rate (i.e., Occupancy) is the sum of rooms occupied divided by the sum of rooms available, based on all facilities owned by both publicly traded and private firms in the county (Cost report worksheets S-2 and S-3)
ROA	Net income from services to patients (Cost report worksheet G-3) deflated by beginning total assets (Cost report worksheet G)
Accruals	Net income from services to patients minus operating cash flow deflated by beginning total assets (Cost report worksheet G)
Cash Flow	Operating cash flow calculated based on the balance sheet approach following Collins et al. (2014) Footnote 5 (Cost report worksheet G, the current portion of long-term liabilities and deferred tax income and credits are unavailable) deflated by beginning total assets
ΔEmployee	Annual percentage growth in the number of employees (Cost report worksheet S-3)
Employee/Asset	Number of employees deflated by beginning total assets
Skill- Salary	Facility’s proportion of total salary paid that are attributable to higher-skilled nurses (Cost report worksheet S-3 Part V)
Skill- Hour	Facility’s proportion of total hours worked that are attributable to higher-skilled nurses (Cost report worksheet S-3 Part V)

Figure 1 Debt Covenant and Historical Return Volatility

This graph presents the median value of historical return volatility by the number of covenants owned by a firm in year t. The sample of 18,908 publicly traded manufacturing firm-years is classified into: 14,661 firm-years with zero covenants, 108 firm-years with one covenant, 179 firm-years with two covenants, 686 firm-years with three covenants, 1,426 firm-years with four covenants, 648 firm-years with five covenants, 277 firm-years with six covenants, 522 firm-years with seven covenants, 303 firm-years with eight covenants, and 98 firm-years with more than eight covenants. Historical return volatility is the standard deviation of twenty-four monthly stock returns from year t-2 to year t-1 (CRSP: RET).

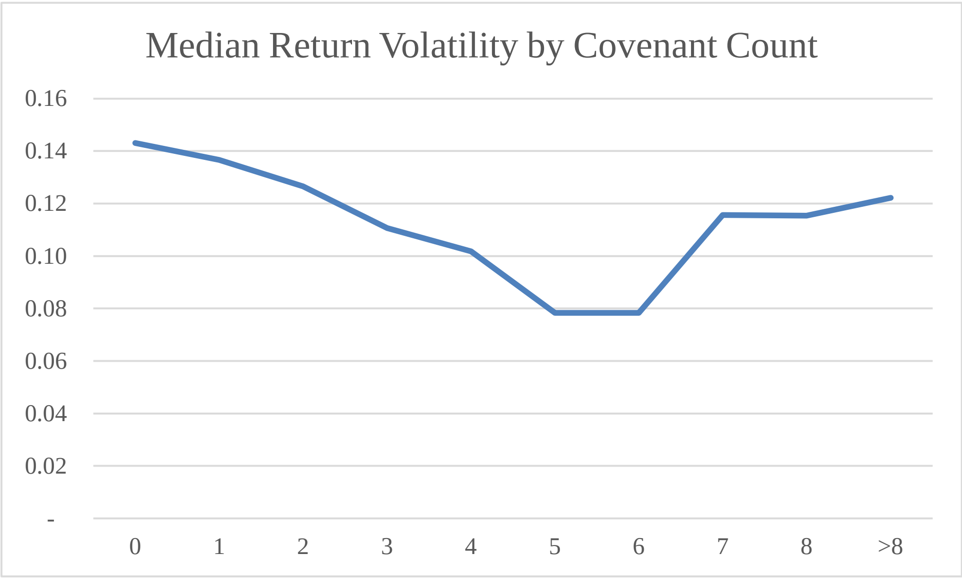

Figure 2 Debt Covenant and Historical Loss Frequency

This graph presents the mean value of historical loss frequency by the number of covenants owned by a firm in year t. The sample of 18,908 publicly traded manufacturing firm-years is classified into: 14,661 firm-years with zero covenants, 108 firm-years with one covenant, 179 firm-years with two covenants, 686 firm-years with three covenants, 1,426 firm-years with four covenants, 648 firm-years with five covenants, 277 firm-years with six covenants, 522 firm-years with seven covenants, 303 firm-years with eight covenants, and 98 firm-years with more than eight covenants. Historical loss frequency is the count of losses, negative annual earnings before extraordinary items (Compustat: IB), from year t-2 to year t-1. For example, if a firm incurred losses in both year t-1 and t-2, its loss frequency equals 2.

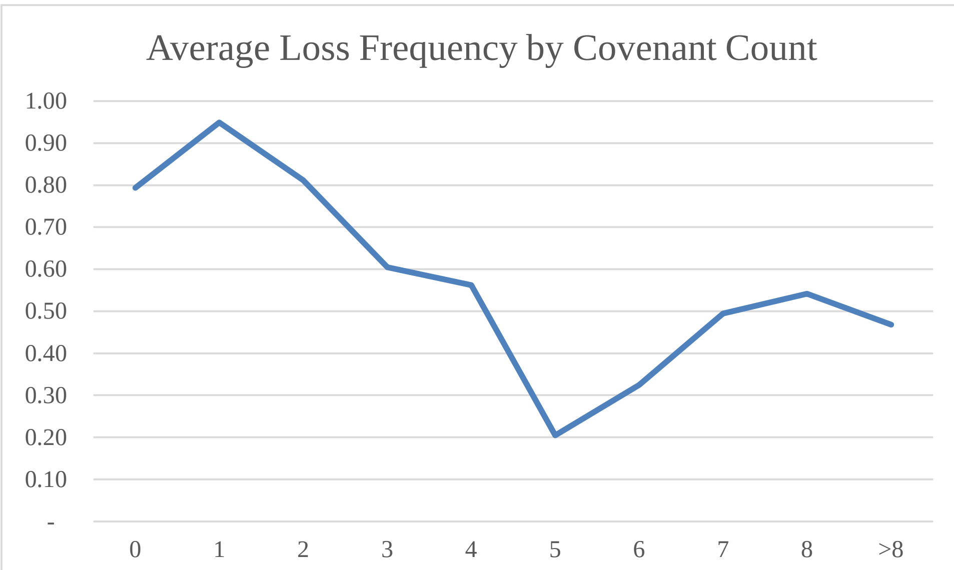

Table 1 Summary Statistics for the Manufacturing Firm Sample

The sample includes 18,908 publicly traded manufacturing firm-years (NAICS 31-33) for 2,880 distinct firms in 338 distinct six-digit NAICS codes during the 2003–2015 period. Return is the twelve-month cumulative return from the fourth month after the prior fiscal year end (CRSP: RET). ΔShipping is the annual rate of growth in the dollar value of goods shipped to customers by the industry (Census Bureau Annual Survey of Manufacturers). Earnings are the annual earnings before extraordinary items (Compustat: IB) deflated by beginning market capitalization (CRSP: PRC×SHROUT). ROA is earnings (Compustat: IB) deflated by beginning total assets (Compustat: AT). Accruals are earnings minus operating cash flow. Cash Flow is operating cash flow from the statement of cash flow (Compustat: OANCF). If statement of cash flow is missing, we use the balance sheet approach following Collins et al. (2014) Footnote 5. Write-downs are impairments of long-lived assets (Compustat: WDP and GDWLIP). Other Accruals are accruals minus write-downs. All these variables are deflated by the beginning total assets. ΔEmployee is the annual percentage growth in the number of employees (Compustat: EMP). Employee/Asset is the number of employees deflated by beginning total assets times 1,000. Union Rate is the percentage of employees belonging to unions (collected from 10-Ks). Median Wage is the median hourly rate by the industry (Bureau of Labor Occupational Employment Statistics). We require all variables not missing (except for union rate, volatility, and loss frequency) and a positive value for all deflators. Only 759 firm-years report a positive union rate. All variables are winsorized at +/-1%.

Panel A Variable Distribution

	N	Mean	25th	50th	75th	Std. dev.
Return	18908	0.18	-0.25	0.05	0.38	0.79
ΔShipping	18908	0.03	-0.03	0.03	0.09	0.15
Earnings	18908	0.00	-0.09	0.03	0.07	0.67
ROA	18908	-0.07	-0.11	0.03	0.08	0.30
Accruals	18908	-0.07	-0.10	-0.05	-0.01	0.14
Cash Flow	18908	0.00	-0.03	0.07	0.13	0.25
Write-downs	18908	-0.03	0.00	0.00	0.00	0.29
Other Accruals	18908	-0.07	-0.10	-0.05	-0.01	0.14
ΔEmployee	18908	0.06	-0.05	0.02	0.12	0.26
Employee/Asset	18908	4.27	1.70	3.08	5.38	4.10
Union Rate	759	0.22	0.08	0.17	0.32	0.21
Median Wage	18908	21.42	17.32	21.01	25.40	5.28
Covenant	18908	1.06	0.00	0.00	0.00	2.15
Volatility	18734	0.15	0.09	0.13	0.19	0.09
Loss Frequency	13281	0.72	0.00	0.00	2.00	0.86

Table 1 Summary Statistics for the Manufacturing Firm Sample (Cont.)

Panel B Correlation Matrix

The upper right triangle presents Pearson correlations and the lower left triangle presents Spearman correlations. * Two-tailed p<0.10; ** p<0.05; *** p<0.01.

	Return	ΔShipping	Earnings	ROA	Accruals	Cash Flow	Write-downs	Other Accruals	ΔEmployee	Employee/ Asset	Union Rate	Median Wage	Covenant	Volatility	Loss
Return		(0.02) **	0.01	0.08 ***	0.00	0.10 ***	(0.04) ***	0.00	0.02 ***	0.05 ***	(0.06)	(0.06) ***	0.01	0.09 ***	0.00
ΔShipping	0.00		0.04 ***	(0.01) *	0.03 ***	(0.03) ***	0.01	0.03 ***	0.07 ***	(0.02) **	0.04	(0.06) ***	0.01 *	0.03 ***	0.01 *
Earnings	0.29 ***	0.07 ***		0.30 ***	0.21 ***	0.24 ***	0.14 ***	0.20 ***	0.04 ***	0.04 ***	(0.03)	(0.04) ***	0.01	(0.16) ***	(0.31) ***
ROA	0.25 ***	0.05 ***	0.85 ***		0.54 ***	0.87 ***	0.11 ***	0.54 ***	(0.01) *	0.10 ***	0.01	(0.12) ***	0.15 ***	(0.36) ***	(0.56) ***
Accruals	0.04 ***	0.09 ***	0.39 ***	0.39 ***		0.11 ***	0.13 ***	1.00 ***	(0.02) ***	0.03 ***	0.05	(0.05) ***	0.04 ***	(0.12) ***	(0.19) ***
Cash Flow	0.26 ***	(0.02) ***	0.66 ***	0.79 ***	(0.10) ***		0.06 ***	0.11 ***	0.00	0.10 ***	(0.05)	(0.12) ***	0.16 ***	(0.37) ***	(0.57) ***
Write-downs	0.05 ***	0.03 ***	0.12 ***	0.11 ***	0.13 ***	0.04 ***		0.13 ***	0.07 ***	(0.01)	0.00	0.02 **	0.05 ***	(0.06) ***	(0.09) ***
Other Accruals	0.04 ***	0.09 ***	0.39 ***	0.39 ***	1.00 ***	(0.10) ***	0.13 ***		(0.02) ***	0.03 ***	0.05	(0.05) ***	0.04 ***	(0.12) ***	(0.19) ***
ΔEmployee	0.07 ***	0.14 ***	0.15 ***	0.17 ***	0.07 ***	0.12 ***	0.14 ***	0.07 ***		0.12 ***	0.01	0.03 ***	(0.02) ***	0.05 ***	(0.08) ***
Employee/ Asset	0.09 ***	(0.02) **	0.18 ***	0.17 ***	0.05 ***	0.15 ***	0.02 ***	0.05 ***	0.07 ***		0.06 *	(0.27) ***	(0.14) ***	0.04 ***	(0.08) ***
Union Rate	(0.01)	0.03	(0.00)	(0.01)	0.02	(0.05)	0.02	0.02	(0.00)	0.02		(0.02)	(0.07) *	0.13 ***	0.06
Median Wage	(0.09) ***	(0.09) ***	(0.13) ***	(0.13) ***	(0.05) ***	(0.12) ***	0.07 ***	(0.05) ***	0.05 ***	(0.33) ***	(0.04)		(0.03) ***	0.06 ***	0.14 ***
Covenant	0.05 ***	0.01	0.13 ***	0.13 ***	0.02 ***	0.15 ***	(0.04) ***	0.02 ***	(0.02) ***	(0.13) ***	(0.02)	(0.03) ***		(0.19) ***	(0.16) ***
Volatility	(0.03) ***	0.04 ***	(0.36) ***	(0.40) ***	(0.10) ***	(0.39) ***	(0.03) ***	(0.10) ***	0.02 ***	(0.01) *	0.14 ***	0.09 ***	(0.23) ***		0.46 ***
Loss Frequency	(0.11) ***	0.00	(0.56) ***	(0.63) ***	(0.18) ***	(0.58) ***	(0.04) ***	(0.18) ***	(0.12) ***	(0.12) ***	0.04	0.15 ***	(0.15) ***	0.51 ***	

Table 2 Replication of Basu (1997) with Δ*Shipping* as the Proxy for News

This table presents results from pooled regressions with firm and year fixed effects and standard errors clustered by six-digit NAICS industry and year. The sample includes 18,908 publicly traded manufacturing firm-years (NAICS 31-33) for 2,880 distinct firms in 338 distinct six-digit NAICS codes during the 2003–2015 period. Return is the twelve-month cumulative return from the fourth month after the prior fiscal year end (CRSP: RET). ΔShipping is the annual rate of growth in the dollar value of goods shipped to customers by the industry (Census Bureau Annual Survey of Manufacturers). Earnings are annual earnings before extraordinary items (Compustat: IB) deflated by beginning market capitalization (CRSP: PRC×SHROUT). ROA is earnings (Compustat: IB) deflated by beginning total assets (Compustat: AT). All variables are winsorized at +/-1%. * Two-tailed p<0.10; ** p<0.05; *** p<0.01.

Dependent variable:		Earnings			ROA	
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-0.02 **	-0.02 ***	-0.01 **	0.00	0.00	0.00
D	-0.05 ***		-0.05 ***	0.01		0.01
Return	-0.04 ***		-0.04 ***	-0.01		-0.01
D × Return	**0.09** ***		**0.08** ***	**0.14** ***		**0.13** ***
D		0.00	0.00		0.00	0.00
ΔShipping		0.01	0.01		0.00	0.00
D × ΔShipping		**0.23** ***	**0.22** ***		**0.09** ***	**0.08** ***
N	18,908	18,908	18,908	18,908	18,908	18,908
Adj. R^2	0.016	0.014	0.017	0.023	0.008	0.024

Table 3 Accruals versus Operating Cash Flows

This table presents results from pooled regressions with firm and year fixed effects and standard errors clustered by six-digit NAICS industry and year. The sample includes 18,908 publicly traded manufacturing firm-years (NAICS 31-33) for 2,880 distinct firms in 338 distinct six-digit NAICS codes during the 2003–2015 period. Return is the twelve-month cumulative return from the fourth month after the prior fiscal year end (CRSP: RET). ΔShipping is the annual rate of growth in the dollar value of goods shipped to customers by the industry (Census Bureau Annual Survey of Manufacturers). Accruals are earnings minus operating cash flow deflated by beginning total assets (Compustat: AT). Cash Flow is operating cash flow from the statement of cash flow (Compustat: OANCF) deflated by beginning total assets. If statement of cash flow is missing, we use the balance sheet approach following Collins et al. (2014) Footnote 5. All variables are winsorized at +/-1%. * Two-tailed $p<0.10$; ** $p<0.05$; *** $p<0.01$.

Dependent variable:		**Accruals**			**Cash Flow**	
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.00	0.00	0.00	0.00	0.00	0.00
D	0.01 **		0.01 **	0.00		0.00
Return	-0.01 ***		-0.01 ***	0.00		0.00
D × Return	**0.05** ***		**0.05** ***	**0.09** ***		**0.09** ***
D		0.00	0.00		0.00	0.00
ΔShipping		0.00	0.00		0.00	0.00
D × ΔShipping		**0.06** ***	**0.06** ***		**0.03**	**0.02**
N	18,908	18,908	18,908	18,908	18,908	18,908
Adj. R^2	0.017	0.015	0.018	0.018	0.002	0.018

Table 4 Impairments of Long-lived Assets versus Other Accruals

This table presents results from pooled regressions with firm and year fixed effects and standard errors clustered by six-digit NAICS industry and year. The sample includes 18,908 publicly traded manufacturing firm-years (NAICS 31-33) for 2,880 distinct firms in 338 distinct six-digit NAICS codes during the 2003–2015 period. Return is the twelve-month cumulative return from the fourth month after the prior fiscal year end (CRSP: RET). ΔShipping is the annual rate of growth in the dollar value of goods shipped to customers by the industry (Census Bureau Annual Survey of Manufacturers). Write-downs are impairments of long-lived assets (Compustat: WDP and GDWLIP) deflated by beginning total assets. Other Accruals are accruals minus write-downs, deflated by beginning total assets. Accruals are earnings minus operating cash flow. Cash Flow is operating cash flow from the statement of cash flow (Compustat: OANCF). If statement of cash flow is missing, we use the balance sheet approach following Collins et al. (2014) Footnote 5. All variables are winsorized at +/-1%. * Two-tailed p<0.10; ** p<0.05; *** p<0.01.

Dependent variable:	**Write-downs**			**Other Accruals**		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.01 ***	0.01 ***	0.01 ***	0.00	0.00	0.00
D	0.00		0.00	0.01 **		0.01 **
Return	-0.02 **		-0.02 **	-0.01 ***		-0.01 ***
D × Return	**0.05 *****		**0.05 *****	**0.05 *****		**0.05 *****
D		0.00	0.00		0.00	0.00
ΔShipping		0.00	0.00		0.00	0.00
D × ΔShipping		**0.01**	**0.01**		**0.06 *****	**0.06 *****
N	18,908	18,908	18,908	18,908	18,908	18,908
Adj. R^2	0.013	0.012	0.013	0.017	0.015	0.018

Table 5 Distinguishing Cost Stickiness and Curtailment

This table presents results from pooled regressions with firm and year fixed effects and standard errors clustered by six-digit NAICS industry and year. The sample includes 18,908 publicly traded manufacturing firm-years (NAICS 31-33) for 2,880 distinct firms in 338 distinct six-digit NAICS codes during the 2003–2015 period. Return is the twelve-month cumulative return from the fourth month after the prior fiscal year end (CRSP: RET). ΔShipping is the annual rate of growth in the dollar value of goods shipped to customers by the industry (Census Bureau Annual Survey of Manufacturers). ΔEmployee is the annual percentage growth in the number of employees (Compustat: EMP). Employee/Asset is the number of employees deflated by beginning total assets times 1,000. All variables are winsorized at +/-1%. * Two-tailed p<0.10; ** p<0.05; *** p<0.01.

Dependent variable:	**ΔEmployee**			**Employee/Asset**		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-0.01	-0.01	-0.01	-0.42 ***	-0.47 ***	-0.41 ***
D	0.01 **		0.01 **	-0.05		-0.05
Return	-0.01		-0.01	0.13 ***		0.13 ***
D × Return	**0.13** ***		**0.13** ***	**0.56** ***		**0.55** ***
D		-0.01 **	-0.01 **		-0.10 ***	-0.10 ***
ΔShipping		0.01	0.01		-0.02	-0.02
D × ΔShipping		**0.08** ***	**0.08** ***		**0.55** ***	**0.50** ***
N	18,908	18,908	18,908	18,908	18,908	18,908
Adj. R^2	0.030	0.026	0.032	0.076	0.067	0.077

Table 6 Changes in Employees (ΔEmployee) and Labor Adjustment Costs

This table presents results from pooled regressions with firm and year fixed effects and standard errors clustered by six-digit NAICS industry and year. The sample includes 18,908 publicly traded manufacturing firm-years (NAICS 31-33) for 2,880 distinct firms in 338 distinct six-digit NAICS codes during the 2003–2015 period. Return is the twelve-month cumulative return from the fourth month after the prior fiscal year end (CRSP: RET). ΔShipping is the annual rate of growth in the dollar value of goods shipped to customers by the industry (Census Bureau Annual Survey of Manufacturers). Dependent variable ΔEmployee is the annual percentage growth in the number of employees (Compustat: EMP). Union Rate is the percentage of employees belonging to unions (collected from 10-Ks). Median Wage is the median hourly rate by the industry (Bureau of Labor Occupational Employment Statistics). We require all variables not missing (except for the union rate) and a positive value for all deflators. Only 759 firm-years report a positive union rate. All variables are winsorized at +/-1%. * Two-tailed p<0.10; ** p<0.05; *** p<0.01.

Labor Adj. Cost:	**Union Rate**		**Median Wage**	
News proxy:	Return	ΔShipping	Return	ΔShipping
Intercept	-0.03 **	-0.03 **	0.01	0.01
D	0.00	-0.02	-0.12 *	-0.07
News	-0.03 **	-0.04 **	0.02	0.17 *
D × News	**0.20** ***	**0.77** ***	**-0.20**	**0.92** ***
Labor Adj. Cost	-0.21 *	-0.22 **	-0.25 ***	-0.24 ***
Labor Adj. Cost × D	0.01	0.08	0.04 **	0.02
Labor Adj. Cost × News	0.01	0.21	-0.01	-0.06 *
Labor Adj. Cost × D × New	**-0.35** *	**-1.63**	**0.11** *	**-0.26** **
N	759	759	18,908	18,908
Adj. R^2	0.027	0.052	0.033	0.029

Table 7 Level of Employees (Employee/Asset) and Labor Adjustment Costs

This table presents results from pooled regressions with firm and year fixed effects and standard errors clustered by six-digit NAICS industry and year. The sample includes 18,908 publicly traded manufacturing firm-years (NAICS 31-33) for 2,880 distinct firms in 338 distinct six-digit NAICS codes during the 2003–2015 period. Return is the twelve-month cumulative return from the fourth month after the prior fiscal year end (CRSP: RET). ΔShipping is the annual rate of growth in the dollar value of goods shipped to customers by the industry (Census Bureau Annual Survey of Manufacturers). Dependent variable Employee/Asset is the number of employees deflated by beginning total assets times 1,000. Union Rate is the percentage of employees belonging to unions (collected from 10-Ks). Median Wage is the median hourly rate by the industry (Bureau of Labor Occupational Employment Statistics). We require all variables not missing (except for the union rate) and a positive value for all deflators. Only 759 firm-years report a positive union rate. All variables are winsorized at +/-1%. * Two-tailed p<0.10; ** p<0.05; *** p<0.01.

Labor Adj. Cost:	**Union Rate**		**Median Wage**	
News proxy:	Return	ΔShipping	Return	ΔShipping
Intercept	-0.06	-0.05	-0.11 ***	-0.15 ***
D	0.44 *	0.16	-0.91	-1.43 ***
News	-0.04	-0.11	-0.19	0.22
D × News	**1.59** ***	**4.07** ***	**5.96** ***	**13.00** ***
Labor Adj. Cost	-0.29	-0.29	-4.95 ***	-5.09 ***
Labor Adj. Cost × D	-0.77	-0.92	0.29	0.46 ***
Labor Adj. Cost × News	0.02	0.46	0.10	-0.09
Labor Adj. Cost × D × New	**-0.13**	**-3.89**	**-1.74** ***	**-3.93** ***
N	759	759	18,908	18,908
Adj. R^2	0.030	0.029	0.097	0.090

Table 8 Debt Covenants and the Conditional Conservatism–driven Asymmetric Timeliness

This table presents results from pooled regressions with firm and year fixed effects and standard errors clustered by six-digit NAICS industry and year. The sample includes 18,908 publicly traded manufacturing firm-years or 13,281 firm-years when requiring non-missing annual earnings from the previous two years. Return is the twelve-month cumulative return from the fourth month after the prior fiscal year end (CRSP: RET). ΔShipping is the annual rate of growth in the dollar value of goods shipped to customers by the industry (Census Bureau Annual Survey of Manufacturers). Dependent variable is Earnings as the annual earnings before extraordinary items (Compustat: IB) deflated by beginning market capitalization (CRSP: PRC×SHROUT). Covenant is the number of covenants in public debts (Mergent Fixed Income Securities). Covenant (1-3), (4-6), or (7-11) is an indicative variable for firms having 1-3, 4-6, or 7-11 covenants in year t. Volatility is the standard deviation of twenty-four monthly stock returns from year t-2 to year t-1. Loss frequency is the count of losses, negative annual earnings before extraordinary items (Compustat: IB), from year t-2 to year t-1. All variables are winsorized at +/-1%. * Two-tailed $p<0.10$; ** $p<0.05$; *** $p<0.01$.

News Proxy:	**Return**		**ΔShipping**	
	(1)	(2)	(3)	(4)
Intercept	-0.02 **	-0.01	-0.02 ***	-0.02 *
D	-0.07 ***	-0.05 **	-0.01	0.03 *
News	-0.04 ***	0.07 ***	0.00	-0.01
D × News	**0.05** *	**0.08**	**0.22** ***	**0.31** **
Covenant (1-3)	0.00	0.03	0.02	0.03
Covenant (1-3) × D	0.15 **	0.08 **	0.07	0.04
Covenant (1-3) × News	0.02	-0.03	-0.05	-0.04
Covenant (1-3) × D × News	**0.31** **	**0.18**	**0.07**	**0.14**
Covenant (4-6)	-0.02	-0.02	-0.01	0.00
Covenant (4-6) × D	0.08 ***	0.09 ***	0.03 *	0.02
Covenant (4-6) × News	0.03	0.05 **	-0.07	-0.07
Covenant (4-6) × D × News	**0.11**	**0.15** *	**0.20**	**0.17**
Covenant (7-11)	0.03	0.01	0.01	0.01
Covenant (7-11) × D	0.00	0.02	-0.01	-0.05 *
Covenant (7-11) × News	-0.02	-0.01	0.02 **	0.00
Covenant (7-11) × D × News	**0.18** **	**0.15** *	**-0.10**	**-0.05**
Volatility		0.15 *		0.22 ***
Volatility × D		0.09		-0.22 *
Volatility × News		-0.25 **		0.21
Volatility × D × News		**-0.15**		**-1.89** **
Loss Frequency		-0.02 **		-0.02 ***
Loss × D		0.00		-0.01
Loss × News		-0.04 ***		-0.01 *
Loss × D × News		**0.03**		**0.15** **
N	18,908	13,281	18,908	13,281
Adj. R^2	0.017	0.035	0.014	0.024

Table 9 Summary Statistics for the Skilled Nursing Facilities Sample

The sample includes 108,345 skilled nursing facilities-years (SIC 8051) during the 1998–2014 period for 11,350 distinct subsidiary-level facilities. ΔOccupancy is the annual rate of growth in the room occupancy rate for the county in which the facility is located (CMS cost report). The county-level occupancy rate (i.e., *Occupancy*) is the sum of rooms occupied divided by the sum of rooms available, based on all facilities owned by both publicly traded and private firms in the county (Cost report worksheets S-2 and S-3). ROA is net income from services to patients (Cost report worksheet G-3) deflated by beginning total assets (Cost report worksheet G). Accruals are net income from services to patients minus operating cash flow. Cash Flow is operating cash flow calculated based on the balance sheet approach following Collins et al. (2014) Footnote 5 (Cost report worksheet G, the current portion of long-term liabilities and deferred tax income and credits are unavailable). ΔEmployee is the annual percentage growth in the number of employees (Cost report worksheet S-3). Employee/Asset is the number of employees deflated by beginning total assets. Skill- Salary (Hour) is the facility's proportion of total salary paid (total hours worked) that are attributable to higher-skilled nurses (Cost report worksheet S-3 Part V). Higher-skilled nurses are Registered Nurses (Bachelor's degree) and Licensed Practical Nurses (one or two year program). The median hourly wage for RN is $31.6, $24.1 for LPN, $13.4 for Certified Nursing Assistant and $14.2 for non-nurse employees. The skill-level compensation data is only available after 2010 following the CMS additional disclosure requirements. We require all variables not missing and a positive value for deflators. All variables are winsorized at +/-1%.

Panel A Variable Distribution

	N	Mean	25th	50th	75th	Std. dev.
ΔOccupancy	108345	0.00	-0.02	0.00	0.02	0.05
ROA	108345	0.02	-0.09	0.04	0.20	0.50
Accruals	108345	-0.04	-0.15	0.05	0.26	0.87
Cash Flow	108345	0.06	-0.24	0.01	0.27	0.92
ΔEmployee	108345	0.23	-0.04	0.00	0.09	1.14
Employee/Asset	108345	0.05	0.01	0.03	0.06	0.09
Skill- Salary	19623	0.36	0.30	0.35	0.41	0.08
Skill- Hour	19623	0.22	0.19	0.22	0.25	0.05

Table 9 Summary Statistics for the Skilled Nursing Facilities Sample (Cont.)

Panel B Correlation Matrix

The upper right triangle presents Pearson correlations and the lower left triangle presents Spearman correlations. * Two-tailed p<0.10; ** p<0.05; *** p<0.01.

	ΔOccupancy	ROA	Accruals	Cash Flow	ΔEmployee	Employee/Asset	Skill- Salary	Skill- Hour
ΔOccupancy		0.02 ***	0.00	0.01 ***	0.12 ***	0.00	(0.00)	(0.01) **
ROA	0.04 ***		0.26 ***	0.28 ***	(0.01) ***	(0.18) ***	(0.03) ***	(0.04) ***
Accruals	0.01 ***	0.26 ***		(0.81) ***	(0.01) ***	(0.11) ***	0.05 ***	0.02 ***
Cash Flow	0.02 ***	0.34 ***	(0.71) ***		(0.00)	0.05 ***	(0.07) ***	(0.04) ***
ΔEmployee	0.13 ***	0.06 ***	0.03 ***	0.02 ***		0.05 ***	(0.03) ***	(0.05) ***
Employee/Asset	(0.00)	0.07 ***	(0.01) ***	0.09 ***	0.09 ***		(0.06) ***	(0.05) ***
Skill- Salary	0.00	(0.05) ***	0.06 ***	(0.08) ***	(0.00)	(0.08) ***		0.79 ***
Skill- Hour	(0.02) **	(0.05) ***	0.04 ***	(0.07) ***	(0.03) ***	(0.05) ***	0.79 ***	

Table 10 Replication of Basu (1997) with Δ*Occupancy* as the proxy for news

This table reports average annual cross-sectionally estimated coefficients and their standard errors based on the Fama-MacBeth (1973) procedure) with firm fixed effects. The sample includes 108,345 skilled nursing facilities-years (SIC 8051) during the 1998–2014 period for 11,350 distinct subsidiary-level facilities. ΔOccupancy is the annual rate of growth in the room occupancy rate for the county in which the facility is located (CMS cost report). The county-level occupancy rate (i.e., *Occupancy*) is the sum of rooms occupied divided by the sum of rooms available, based on all facilities owned by both publicly traded and private firms in the county (Cost report worksheets S-2 and S-3). ROA is net income from services to patients (Cost report worksheet G-3) deflated by beginning total assets (Cost report worksheet G). Accruals are net income from services to patients minus operating cash flow. Cash Flow is operating cash flow calculated based on the balance sheet approach following Collins et al. (2014) Footnote 5 (Cost report worksheet G, the current portion of long-term liabilities and deferred tax income and credits are unavailable). We require all variables not missing and a positive value for deflators. All variables are winsorized at +/-1%.

Dependent variable:	**ROA**	**Accruals**	**Cash Flow**
Intercept	0.04 ***	-0.01	0.06 ***
D	-0.02 ***	-0.01	-0.01
ΔOccupancy	-0.19	-0.67 ***	0.35 **
D × ΔOccupancy	**0.92** ***	**1.52** ***	**-0.35**
N	108,345	108,345	108,345
Adj. R^2	0.003	0.001	0.0003

Table 11 Distinguishing Cost Stickiness and Curtailment using Labor Adjustment Costs based on Skill Levels

This table reports average annual cross-sectionally estimated coefficients and their standard errors based on the Fama-MacBeth (1973) procedure) with firm fixed effects. The sample includes 108,345 skilled nursing facilities-years (SIC 8051) during the 1998–2014 period for 11,350 distinct subsidiary-level facilities. ΔOccupancy is the annual rate of growth in the room occupancy rate for the county in which the facility is located (CMS cost report). The county-level occupancy rate (i.e., *Occupancy*) is the sum of rooms occupied divided by the sum of rooms available, based on all facilities owned by both publicly traded and private firms in the county (Cost report worksheets S-2 and S-3). ΔEmployee is the annual percentage growth in the number of employees (Cost report worksheet S-3). Employee/Asset is the number of employees deflated by beginning total assets. Skill- Salary (Hour) is the facility's proportion of total salary paid (total hours worked) that are attributable to higher-skilled nurses (Cost report worksheet S-3 Part V). Higher-skilled nurses are Registered Nurses (Bachelor's degree) and Licensed Practical Nurses (one or two year program). The median hourly wage for RN is $31.6, $24.1 for LPN, $13.4 for Certified Nursing Assistant and $14.2 for non-nurse employees. The skill-level compensation data is only available after 2010 following the CMS additional disclosure requirements. We require all variables not missing and a positive value for deflators. All variables are winsorized at +/-1%.

Dependent variable:	**ΔEmployee**		**Employee/Asset**	
Skill is based on:	Salary	Hour	Salary	Hour
Intercept	0.14	0.14	0.06 ***	0.06 ***
D	-0.07	-0.05	0.00	0.00
ΔOccupancy	-0.72	-0.96 **	-0.05	-0.04
D × ΔOccupancy	**1.59** *	**1.69** *	**0.02**	**0.10**
Skill	-0.25	-0.41 *	-0.04 *	-0.04 *
Skill × D	0.16	0.15 *	0.00	-0.02
Skill × ΔOccupancy	2.75 *	5.42 **	0.55	0.78
Skill × D × ΔOccupancy	**-4.12** *	**-7.09** *	**-0.61**	**-1.30**
N	19,623	19,623	19,623	19,623
Adj. R^2	0.011	0.011	0.013	0.012